



ORIGINAL RESEARCH PAPER

Radio-Diagnosis

CLINICO-SONOLOGICAL AND PATHOLOGICAL CORRELATION OF SCROTAL LESIONS.

KEY WORDS: High Resolution Ultrasonography, Doppler Ultrasonography.

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ABSTRACT

Introduction: Major pathology may be missed during a routine checkup, and physical examination, findings may be misinterpreted. High frequency US has become the method of choice for examining scrotal and testicular pathology. Ultrasonography is exceptionally well suited to study of scrotum and its contents. **Material and Methods:** A descriptive study was conducted for a period of 14 month from September 2021 to November 2022 by our Department of radio diagnosis at Hind institute of medical science, Barabanki(up.) India. All the cases age 18 to 70 yrs. with a scrotal condition were included and performed ultra-sonogram. Patients with Inguinal-scrotal swelling (hernia) and cases below 18 yrs. and above 70 yrs. were excluded from the study. All the cases were performed USG, using Machine- 1 -GE Logiq F8 expert / probe used -6-12 MHz 2. Acuson nx3 elite siemens/. linear probe -5-10 MHz in supine position. Results:51% of cases were between 31-40 years.26 cases had disease bilaterally, unilaterally in 48 cases out of 74 cases. 32 cases of inflammatory pathology, 42 cases of noninflammatory pathology and 6 normal cases were included. Chronic epididymorchitis was the commonest inflammatory pathology (35.5%) and Hydrocele common noninflammatory pathology (57%). The sensitivity and specificity of clinical diagnosis was found to be 75% and 40% respectively whereas Ultrasound and Color Doppler aided diagnosis, had around 99% sensitivity and 100% specificity. **Conclusion:** High frequency ultrasonography with color Doppler is highly accurate and sensitive modality for diagnosis of scrotal pathology as compared to clinical and physical examination.

INTRODUCTION

Right and left testicles, the epididymis, and the lowest portion of the spermatic cord are all contained in the scrotum, which is a cutaneous sac. A ridge, known as the median raphe, divides it into right and left sections on the outside of the penis, backwards down the perineum's midline, and to the anus. It is most easily accessible for clinical examination since it contains skin and fibromuscular tissue. Therefore, one should assume that a scrotal enlargement would be easy to diagnose clinically. some testicular swellings might be extremely challenging to accurately diagnose by a simple physical exam. It can be challenging to determine whether an apparent lump in the scrotum is caused by the testes themselves or by additional testicular tissue. Furthermore, major pathology may be missed during a routine checkup, and physical findings may be misinterpreted. High frequency US has become the method of choice for examining scrotal and testicular pathology since Murray Miskin and Jerald Bain's report on using diagnostic ultrasound to investigate scrotal pathologies was published in 1974.1 This is due to advancements in instrumentation and transducer design. The testis, epididymis, and scrotal wall can all be seen in great anatomical detail with high-resolution sonography. Testicular perfusion can also be measured when color Doppler and power Doppler imaging are used. Ultrasonography is exceptionally well suited to study of scrotum and its contents.2. Glands include the prostate gland and the two seminal vesicles. The testes' primary blood vessels are the right and left testicular arteries. The mature testes are two reproductive organs that are paired and weigh between 10 and 14 grams each. They are roughly 4 cm long and 2.5 cm in diameter.

MATERIAL AND METHODS

A descriptive study was conducted for a period of 14 month from September 2021 to November 2022 at our Department of radio diagnosis in Hind institute of medical sciences, Barabanki(up.) India. The study design was approved by the institutional ethical committee and study protocol was followed as per the guidelines of the committee. The study

was conducted for a period of 14 month and written consent was obtained from all the cases after explaining the details of the study. The demographic data, clinical history, of the cases were noted in a separate clinical record sheet and analyzed. After taking detail history and considering the symptomatology of patient presenting to the Department of Surgery refer to Department of Radio-Diagnosis where they are used, A high resolution, linear array transducer with a frequency of 7 MHz or more is often used because it increased resolutions of the scrotal contents. Images of both scrotal and bilateral inguinal regions are obtained in both transverse and longitudinal view. Color Doppler and pulsed Doppler examination performed, optimized to low-flow velocities, to reveal blood flow in the testes and surrounding scrotal structures. scrotum evaluated with high frequency Ultrasonography and Color Doppler examinations. All the cases age 18 to 70 yrs. referred from surgical departments with a scrotal mass or a scrotal pathological condition were included and performed ultra-sonogram. Patients with Inguinal-scrotal swelling (hernia) clinically or on sonographic assessment .cases below 18 yrs. and above 70 yrs. were excluded from the study.

Procedure of Scrotal Ultra sonogram: All the cases were performed USG using Machine used - USG 1 -GE Logiq F8 expert / probe used -6-12 MHz, 2. Acuson nx3 elite siemens/. linear probe -5-10 MHz ultra sound machines in supine position with a towel support between the thighs. Patients are usually examined in the supine position with a towel wrapped over his thighs to support the scrotum. Warm gel should Additional views may also be obtained with the patient performing Valsalva maneuver. Testicular size determined by calculating testicular volume with the formula for an ellipsoid: $V = L \times W \times H \times 0.72$, where V = volume, L = length, W = width, and H = height.

Statistical Analysis

Data size was fed into computer using IBM SPSS stats 26.0 software chi-square chart, ANOVA, self-determining samples, t test were used to compare the data. sensitivity, specificity,

positive predictive, negative predictive and accuracy values of useful parameters were also resulting statistical significance was considered at p value less than 0.05. EpiInfo 3.5.4 Epiinfo7.1.5 for Microsoft window version 10 were used to calculation of different parameters. Results are depicted using appropriate graphs, tables, and charts.

RESULTS

In the present study conducted, a total of 80 cases were enrolled who fulfilled the inclusion criteria. 26 cases had disease bilaterally , unilaterally in 48 cases in 74 cases the present study conducted.26 cases had disease bilaterally , unilaterally in 48 cases in 74 cases. Out of 48 cases of unilateral side involvement, 22 cases of involvement were on right side, 26 cases involvement was on left side. The age distributions of cases in this study are designated in table-2, which varied from 18 Years to 70 Years. Maximum numbers of cases presented were in the age group of 31 to 40 years (27 cases – 34%), followed by 21 to 30 years (14 cases – 17.5%). The age group of 21 to 40 years constitutes 60% of these cases. Numerous clinical appearances as depicted in table-1. Maximum of the cases Clinically presented with grouping of several symptoms. Combination: Common clinical presentation was grouping of Symptoms like, pain and scrotal swelling, as in 27 cases (34%).

In (57%). The frequency of non-neoplastic scrotal swellings is very much high compared to neoplastic swellings. In this study out of 80 cases, 31 cases were distinguished have inflammatory scrotal pathology on high frequency and color non-neoplastic scrotal swellings, hydrocele is the commonest pathology in 20 cases Doppler ultrasonography scan . Chronic Epididymo-orchitis was the common inflammatory pathology detected, noted in 11cases (35.5%). Next common inflammatory pathology noted was acute Epididymo-orchitis, seen in in 7 cases(22.6%). filariasis 3 cases, Acute orchitis 2 cases (6.5%), chronic epididymitis, cases (6.5%), scrotal wall inflammation 3 cases (10 %), acute epididymitis in 1 cases (3%), Fournier's gangrene and Funiculitis are noted in 1 case each (6.5%).

Table 1: frequency of symptoms

	SYMPTOMS	NOOFCASES
1.	Pain and Scrotal Swelling	27
2.	Pain, Swelling and Fever	3
3.	Scrotal Swelling	23
	Unilateral Swelling	17
	Bilateral Swelling	6
4.	Pain in scrotum	8
	Acute onset	3
	Chronic onset	5
5.	Infertility	9
6.	Trauma	6
7.	Dysuria	5
8.	Discharging wound on scrotal Skin	4
9.	Pain abdomen	2
10.	Erythematous skin rashes	1

Table 2: Distribution of scrotal findings according to age groups

Sr.	Findings	no of cases	% of Cases
1	Acute epididymitis	1	3.2%
2	Acute epididymoorchitis	7	22.5%
3	Acute orchitis	2	6.5%
4	Chronic epididymitis	2	6.5%
5	chronic Epididymoorchitis	11	35.5%
6	Scrotal wall inflammation	3	9.7%
7	Scrota filariasis	3	9.7%

8	Funiculitis	1	6.5%
9	Fournier's gangrene	1	6.5%
	Total	31	100%

TABLE 3:INFLAMMATORY SCROTAL CONDITIONS DISTRIBUTION

Sr. no	Age group (years)	No of cases	Percentage
1	11 – 20	5	6.3 %
2	21 – 30	14	17.5 %
3	31 – 40	27	33.8 %
4	41 – 50	14	17.5 %
5	51 – 60	7	7 %
6	61 – 70	3	3%
	Total	80	100%

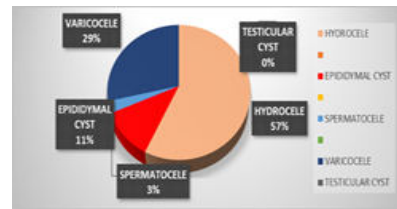


Figure 1: Types of scrotal findings

TABLE 4: Physical examination of scrotal findings

Clinical findings	Final diagnosis		
	Positive Findings	Negative Findings	Total
Positive test	56	03	59
Negative test	19	02	21
TOTAL	75	05	80

{Sensitivity-75%, specificity-40%, NPV-11%}

Present study shows a low sensitivity of physical examination (15%) and low specificity (50%), whereas high frequency ultrasonography is highly sensitive and specific (almost 100%) in differentiating a scrotal finding as either intratesticular/ extra testicular in comparison to physical examination. The frequency of non-neoplastic scrotal swellings is very much high compared to neoplastic swellings. Frequency of extra testicular swellings is more, compared to intra testicular swellings. The positive predictive value of color Doppler ultrasonography in detecting Varicoceles in cases of male infertility, is associated with physical examination. The consequences specify that color Doppler ultrasonography is having max sensitivity (100%) and a max positive % predilection value (72%), as correlated to physical examination. Histopathological examination- Approx. 100% sensitivity and 99 %specificity Malignancy- 2 cases, Spermatocele -1 case, Tubercular -4 cases, Epididymal cyst /Filariasis= 2cases.

Table 5: Examination Of Scrotal Finding On High Frequency Ultrasonography

Ultrasonography findings	Final diagnosis		Total
	Positive Findings	Negative Findings	
Positive test	75	00	75
Negative test	01	04	05
TOTAL	76	04	80

Sensitivity-99%, specificity-100%, NPV-80%, Accuracy-98.75%

Table-5: Comparison of sensitivity and specificity of clinical diagnosis and high-resolution ultrasound diagnosis

Final Findings	Clinical Findings		Ultrasound and Color Doppler Findings	
	Sensitivity	Specificity	Sensitivity	Specificity
Acute Epididymitis	53%	96%	100%	98%
Acute Epididymo Orchitis	37%	86%	100%	98.9%
Acute Orchitis	50%	98%	67%	100%
Torsion	53%	96%	100%	100%
Funiculitis	25%	98%	80%	100%
Chronic Epididymo Orchitis	33%	96%	100%	100%
Chronic Epididymitis	20%	98%	100%	100%
Varicocele	50%	97%	100%	100%

TABLE 6: Comparison between sonological diagnosis with clinical diagnosis

S . N	Clinical Findings	High-frequency US Findings
1	Intratesticular	10 Intra testicular 5 Extra testicular 3 Both intra+extratesticular
2	Extra testicular	20 Extra testicular -- Intratesticular 5 Both intra+extratesticular
3	Both intratesticular +extra testicular	5 Intra testicular 4 Extra testicular 1 Both intra+extra testicular
4	No diagnosis	4 Normal -- Intra testicular 2 Extra testicular -- Both intra+extra testicular
5	Unilateral	27 Bilateral Unilateral
6	Bilateral	6 Unilateral 4 Bilateral

DISCUSSION

The superficial site of the scrotal materials makes them ideally appropriate for sonographic study. The advancement of high frequency, real time scanners has improved diagnostic accuracy of scrotal ultrasonography study. In our study, we have studied 80 patients with high frequency ultrasonography scan and color Doppler, for finding of scrotal and testicular pathology. Clinical background: The age distributions of cases in this study varied from 18 Years to 70 Years. Maximum numbers of cases presented were in the age group of 31 to 40 years (27 cases – 34%), followed by 21 to 30 years (14 cases-17.5%), symptomology- pain and scrotal swelling as in 27 cases (34%), combination of pain, swelling and fever in 3 cases (4%). Swelling: 23 cases reported with only swelling (29%). 8 cases reported exclusively with only pain in scrotum (10%). Out of 80 cases in this study, the pathological findings were detected in 74 cases and 6 cases showed normal findings. Inflammatory findings seen in largest number of cases – 32 cases, Congenital lesions were noted in 5 cases, findings related to male infertility seen in 09 cases, traumatic cases were 7 lesions noted in 7 cases, neoplastic pathology seen in 2 cases. Miscellaneous pathology like, testicular microlithiasis, Inguino-scrotal hernia noted in 16 cases. According to previous study³, in a series of 62 patients, detected the following pathologies: Inflammatory diseases in 16 cases (26%), and non-inflammatory swellings in 45 cases

(67%). According to previous study⁴, in a study of 43 pts (86 testes), noted the following distribution of pathologies: Inflammatory diseases 12 cases, Non-inflammatory diseases in 28 cases. we observed that proportion of Inflammatory pathology is higher, compared to previous studies. Chronic Epididymo orchitis was the commonest inflammatory pathology detected, noted in 18 cases (35%). Next most frequent inflammatory pathology findings detected was acute Epididymo orchitis, seen in 9 cases (28%). According to previous study⁵ of 25 cases of acute inflammatory diseases of scrotum using high-resolution grey scale and power Doppler sonographic study, found epididymitis in 11 cases (44%), Epididymo-orchitis in 10 cases (40%), orchitis in 2 cases (8%), funiculitis in 2 cases (8%) ⁶. These above findings are similar to the findings of according to previous study⁷ of 45 cases (51 hemiscrotum), according to previous study⁵ of 11 cases. In our study, 32 cases of scrotal inflammatory findings, we observed 4 cases of complications of acute scrotal pathology in which 2 cases are scrotal wall Cellulitis, on 1 case of Fournier's gangrene and 1 case of Funiculitis. Of 32 cases of inflammatory scrotal findings, we distinguished chronic Epididymo-orchitis in 11 cases (36%). Out of 11 cases, 4 cases were confirmed to be of tubercular etiology, through biopsy in 6 cases. Two cases of associated scrotal filariasis also noted. The 2 cases of neoplastic swellings were germ cell tumor on histopathological examination confirmed to be seminoma. In non-neoplastic scrotal swellings, hydrocele is the main pathology swelling is noted in 20 (57%). Out of 20 cases, 18 cases were primary vaginal hydrocele (90%), 2 cases were encysted hydrocele of cord (10 %). Hydrocele was noted unilaterally in 17 cases, bilateral in 4 cases. The sensitivity and specificity of High-frequency US compared to physical examination in distinguishing a scrotal mass as either intratesticular or extra testicular were higher. In our study, 35 cases of non-inflammatory scrotal swellings we found 4 cases of epididymal cysts, 1 cases of Spermatoceles. Out of 4 cases of epididymal cyst, 3 were unilateral, one was bilateral and 2 cases presented multiple cysts.

CONCLUSION-

Color Doppler sonography accurately differentiates between testicular ischemia and torsion from acute inflammatory diseases. It can show utility even in acute scrotal conditions, when clinical examination is difficult. It is also highly sensitive in distinguishing intratesticular from extra testicular origin of scrotal masses. It is highly sensitive in separating solid from cystic scrotal lesions. This study also evaluated that most of extra testicular scrotal masses are benign; most of intratesticular scrotal masses are malignant. High frequency ultrasonography is highly sensitive in detection of small, clinically impalpable intratesticular lesions of cyst or small malignant foci nature. High frequency ultrasonography with color Doppler is highly accurate and sensitive modality for diagnosis of scrotal pathology. Hence, in appropriate clinical setting, with adequate history and physical examination, it offers more accurate diagnosis. The advantages of High frequency US and color Doppler includes invasive free nature, lack of ionizing exposure, simplicity, wide easy availability, cost effective and repeatability.

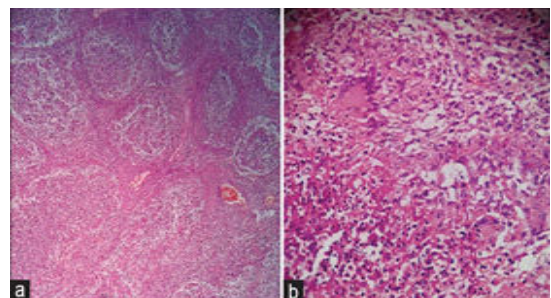


Figure-2 histopathological slide showing Tubercular epididymo-orchitis

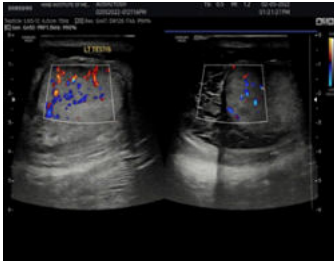


Figure 3: color doppler usg depict color flow in left testes Epididymo-orchitis

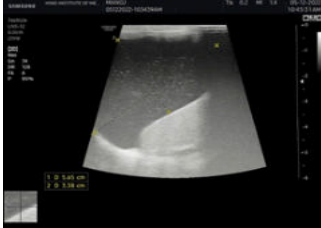


Figure 4: high frequency usg of scrotum showing Spermatocele

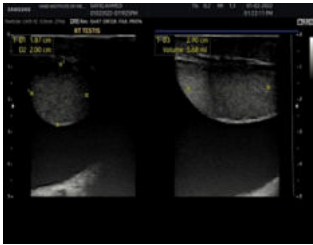


Figure 5: high frequency usg of scrotum Bilateral hydrocele

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